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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/832,541	04/11/2001	David A. Morgenstern	MTC 6638.7	3285

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SENNIGER POWERS LEAVITT AND ROEDEL
ONE METROPOLITAN SQUARE
16TH FLOOR
ST LOUIS, MO 63102

EXAMINER

OH, TAYLOR V

ART UNIT	PAPER NUMBER
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1625

DATE MAILED: 09/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/832,541	Applicant(s) MORGENSTERN ET AL.	
	Examiner Taylor Victor Oh	Art Unit 1625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 March 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-76,93-101 and 169-251 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-76,93-101 and 169-251 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>4/14/05</u> . | 6) <input type="checkbox"/> Other: _____ |

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after allowance or after an Office action under *Ex Parte Quayle*, 25 USPQ 74, 453 O.G. 213 (Comm'r Pat. 1935). Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, prosecution in this application has been reopened pursuant to 37 CFR 1.114. Applicant's submission filed on 1/28/05 has been entered.

The Status of Claims :

Claims 1-76, 93-101, and 169-251 are pending.

Claims 1-76, 93-101, and 169-251 have been rejected.

Claim Rejections - 35 USC § 112

Claims 1-22, 30-59, 67-76, 93-97, 99-101, and 169-251 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a primary alcohol, such as N-methylethanolamine, N-ethyl ethanolamine, N-isopropyl

Art Unit: 1625

methylethanolamine, etc, does not reasonably provide enablement for all the known primary alcohols in the organic chemistry. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to include all the known primary alcohols unrelated to the invention commensurate in scope with these claims. The specification falls short because data essential for how various straight-chain alcohols, cyclic alcohols, heterocyclic alcohols, any aromatic alcohols, any alicyclic alcohols, and a diverse scope of acyclic alcohols and mixtures thereof capable of forming a carboxylic acid would be led to the desired final product by the catalytic dehydrogenation process.

In *In re Wands*, 8 USPQ2d 1400 (1988), factors to be considered in determining whether a disclosure meets the enablement requirement of 35 U.S.C. § 112, first paragraph, have been described. They are:

1. the nature of the invention,
2. the state of the prior art,
3. the predictability or lack thereof in the art,
4. the amount of direction or guidance present,
5. the presence or absence of working examples,
6. the breadth of the claims,
7. the quantity of experimentation needed, and
8. the level of the skill in the art.

The Nature of the Invention

The nature of the invention in claims 1 and 93 is the process for preparing carboxylic acid salt by dehydrogenation of a primary alcohol by contacting an alkaline mixture with a dehydrogenation catalyst containing copper on the supporting structure.

The State of the Prior Art

The states of the prior art are described as followed:

Lazier (U.S. 1,975,853) teaches the process of catalytic dehydrogenation of primary alcohols to the corresponding ester, aldehyde, acid, ketone in presence of a copper catalyst together with zinc oxide or manganese oxide.

Hagemeyer (U.S. 3,254,128) teaches the process of catalytic dehydrogenation of primary alcohols to the aldehydes in presence of a catalytic composition.

Franczyk (U.S. 5,292,936) teaches a process to prepare amino carboxylic acid salts by contacting amino alcohols with an alkali metal hydroxide in the presence of a copper catalyst containing alkali-resistant carriers .

Urano et al (U.S. 5,220,055) teaches a process to prepare amino carboxylic acid salts by an oxidative dehydrogenation reaction of an amino alcohol in the presence of an alkali metal hydroxide in the presence of a copper containing catalyst and water.

Goto et al (U.S. 4,782,183) teaches a process to prepare amino carboxylic acid salts by subjecting to an oxidative dehydrogenation reaction of an a amino alcohol in the presence of an alkali metal and an alkali earth metal , water, and a catalyst containing copper and zirconium.

Franczyk (U.S. 5,367,112) teaches a process to prepare amino carboxylic acid salts by contacting amino alcohols with an alkali metal hydroxide in

Art Unit: 1625

the presence of an effective amount of a copper catalyst containing various metals, such as chromium, titanium, and etc.

As the prior art have been discussed in the above, there is no conclusive data that any primary alcohols, such as straight-chain alcohols, cyclic alcohols, heterocyclic alcohols, any aromatic alcohols, any alicyclic alcohols, and a diverse scope of acyclic alcohols, and mixtures thereof would be sufficient enough to lead to the formation of the final desired carboxylic acid salt.

The predictability or lack thereof in the art

In the instant case, the instant claimed invention is highly unpredictable since one skilled in the art would recognize that dehydrogenating catalytically any primary alcohols consisted of various lengths and sizes of straight-chain alcohols, cyclic alcohols, heterocyclic alcohols, any aromatic alcohols, any alicyclic alcohols, and a diverse scope of acyclic alcohols, and mixtures thereof capable of forming a carboxylic acid salt would result in only the uncertainty of the outcomes of the process as shown in Lazier (U.S. 1,975,853) and Hagemeyer (U.S. 3,254,128) which disclose not only the acid, but also, ester, aldehyde, acid, ketone, which are not the intended final products of the claimed process (the carboxylic acid salt). Therefore, any primary alcohol selected from straight-chain alcohols, cyclic alcohols, heterocyclic alcohols, any aromatic alcohols, any alicyclic alcohols, and a diverse scope of acyclic alcohols, and

Art Unit: 1625

mixtures thereof can not be translated to induce to form the production of the carboxylic acid salt product.

The amount of direction or guidance present

The direction present in the instant specification is that any primary starting alcohols selected from straight-chain alcohols, cyclic alcohols, heterocyclic alcohols, any aromatic alcohols, any alicyclic alcohols, and a diverse scope of acyclic alcohols, and mixtures thereof without a definitive range of carbon-chain length in the starting alcohols can be led to the formation of the desired product.

However, the specification is silent and fails to provide guidance as to whether any straight-chain alcohols, cyclic alcohols, heterocyclic alcohols, any aromatic alcohols, any alicyclic alcohols, and a diverse scope of acyclic alcohols, and mixtures thereof capable of forming the carboxylic acid salt by catalytic dehydrogenation is sufficient enough to allow to form the desired product. Also, there is no direction and guidance for how any primary starting alcohols selected from straight-chain alcohols, cyclic alcohols, heterocyclic alcohols, any aromatic alcohols, any alicyclic alcohols, and a diverse scope of acyclic alcohols, and mixtures thereof capable of forming the carboxylic acid salt by catalytic dehydrogenation can be used for the production of the desired final product.

Accordingly, applicants' specification is devoid of any synthetic procedures or directional guidance that would place all kinds of primary straight-chain alcohols, cyclic alcohols, heterocyclic alcohols, any aromatic alcohols, any alicyclic alcohols, and a diverse scope of acyclic alcohols, and mixtures thereof in possession of the public in

Art Unit: 1625

view of an ultimate patent grant. Undoubtedly, more than routine experimentation would be involved to synthesize said ring systems. Compare *In re Armbruster*, 185 USPQ 152 (CCPA 1975); *In re Angstadt et al*, 190 USPQ 214 (CCPA 1976).

The presence or absence of working examples

There is one example (diethanolamine) for producing the carboxylic acid salts, such as iminodiacetic acid and sodium glycine without mentioning any other specific starting primary alcohol in the examples. Also, the specification fails to provide working examples as to how the other types of any primary straight-chain alcohols, cyclic alcohols, heterocyclic alcohols, aromatic alcohols, alicyclic alcohols, and a diverse scope of acyclic alcohols, and mixtures thereof capable of forming the carboxylic acid salt by catalytic dehydrogenation can be resulted in the only claimed product (carboxylic acids), i.e. again, there is no correlation between the starting material and the desired final product.

The breadth of the claims

The breadth of the claims is the process for catalytically dehydrogenating any starting material selected from straight-chain alcohols, cyclic alcohols, heterocyclic alcohols, any aromatic alcohols, any alicyclic alcohols, and a diverse scope of acyclic alcohols, and mixtures thereof by catalytic dehydrogenation can be led to form the carboxylic acid salt without considering the impact of the boiling points of various starting materials having long chained alcohols on the activity of catalyst; for example, B. P. for n-decyl alcohol is 228 °C, whereas that of glycerol, 290 °C (Organic

Art Unit: 1625

chemistry 2nd ed. P. 646) ; this means that the high dehydrogenation temperature may attribute to losing the selectivity of the catalytic action ; in turn, this could result in a low yielding of the desired final product. Therefore, the reaction condition needs to be varied depending on the types of the alcohol used in the reaction process. Incidentally, the specification has made no remark on this particular aspect of the invention.

The quantity of experimentation needed

The quantity of experimentation needed is undue experimentation. One of skill in the art would need to determine which one of the starting materials selected from straight-chain alcohols, cyclic alcohols, heterocyclic alcohols, any aromatic alcohols, any alicyclic alcohols, and a diverse scope of acyclic alcohols, and mixtures thereof capable of forming the carboxylic acid by catalytic dehydrogenation would be resulted in the claimed desired compound and would furthermore then have to determine which one of the starting materials selected from straight-chain alcohols, cyclic alcohols, heterocyclic alcohols, any aromatic alcohols, any alicyclic alcohols, and a diverse scope of acyclic alcohols, and mixtures thereof, such as the cases of the 2-ethylhexanol, 2,2,4-trimethylpentanol, 2,2-dimethylbutanol starting compounds (see col. 4, lines 5-9) as shown in Hagemeyer (U.S. 3,254,128), would not be resulted in the claimed desired compounds.

Therefore, in view of the Wands factors and In re Fisher (CCPA 1970) discussed above, to practice the claimed invention herein, a person of skill in the art would have to engage in undue experimentation to test which starting material capable of forming the carboxylic acid salt by catalytic dehydrogenation can be employed to produce the

Art Unit: 1625

desired claimed compound encompassed in the instant claims, with no assurance of success.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 2-76, 93-101, and 169-251 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 2-4, 7-8, 11, 19, 32, 34, 35-40, 49, 51, 54, 67-68, 93, 169, 171-176, 190, 196, 216, 219, 222, 225, 228, 231, 234, 237, 240, 243, 246, and 249, the phrase "at least about " is recited. This expression is vague and indefinite because the specification does not point out what is meant by the phrase "at least about ". The mere reciting those terms is invalid as indicated in the MPEP:

A. "About"

The term "about" used to define the area of the lower end of a mold as between 25 to about 45% of the mold entrance was held to be clear, but flexible. *Ex parte Eastwood*,

163 USPQ 316 (Bd. App. 1968). Similarly, in *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), the court held that a limitation defining the stretch rate of a plastic as "exceeding about 10% per second" is definite because infringement could clearly be assessed through the use of a stopwatch.

Art Unit: 1625

However, the court held that claims reciting "at least about" were invalid for indefiniteness where there was close prior art and there was nothing in the specification, prosecution history, or the prior art to provide any indication as to what range of specific activity is covered by the term "about." *Amgen, Inc. v. Chugai Pharmaceutical Co.*, 927 F.2d 1200, 18 USPQ2d 1016 (Fed. Cir. 1991).

Therefore, an appropriate correction is required.

In claims 15, 16, 23, 60, 98, 99, the phrases "said primary alcohol comprises" and "said carboxylic acid salt comprises" are recited. These expressions are vague and indefinite because they do not exclude the presence of other ingredients than the one or ones recited. Therefore, an appropriate correction is required.

In claims 15, 23, 25, 60, 62, and 98, the phrase "substituted hydrocarbyl" is recited. This expression is vague and indefinite because the claim does not specify what the hydrocarbyl is substituted with. Therefore, an appropriate correction is required.

Claim Rejections - 35 USC § 103

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

Art Unit: 1625

not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1, 15-18, 23-31, 46-47, 49-52, 54-75, 93-101, 194-209, and 228-251 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goto et al (US 4,782,183) in view of Franczyk II et al (U.S. 6,646,160 B).

Goto et al teaches a preparation of aminocarboxylic acid salts by oxidizing amine-group-containing primary alcohols, such as diethanolamine, triethanolamine (see col. 3, lines 10-20) with an alkaline medium in the presence of a copper and zirconium catalyst having a copper content of 3 to 50 % by weight based on the total amount of the catalyst (see col. 4, lines 3-6).

Art Unit: 1625

The instant invention, however, differs from the Goto et al in that an alkali metal salt of glycine or an N-alkyl-glycine is mentioned; the process comprises phosphonomethylating the carboxylic acid salt to form N-(phosphonomethyl)iminodiacetic salt, which further is oxidized to N-(phosphonomethyl)glycine or a salt; the claimed non-copper metals are cobalt and molybdenum; the claimed supporting structure is metal sponge.

Franczyk et al teaches a process to prepare amino carboxylic acid salts, such as the salts of glycine, iminodiacetic acid, N-methylglycine by contacting amino alcohols, such as monoethanolamine or diethanolamine (see col. 3, line 35) with an alkali metal hydroxide in the presence of a copper catalyst containing alkali-resistant carriers (see col. 4, lines 55-60); in addition, the catalyst comprises the followings (see col. 2, lines 34-38): one or

more of elements selected is from the group consisting of copper, cobalt, nickel, and cadmium as well as optionally lesser amounts of chromium, titanium, niobium, tantalum, zirconium, vanadium, molybdenum, manganese, tungsten, cobalt, nickel, and mixtures thereof.

Also, the reaction contains less than 100 ppm of oxidized copper either in soluble, complexed, colloidal or particulate form during the reaction (see col. 2, lines 39-43). Furthermore, the process can be involved in phosphonomethylating the carboxylic acid salt to form N-(phosphonomethyl)iminodiacetic acid or a salt, which further can be converted to N-(phosphonomethyl)glycine or a salt (see col. 3, lines 51-58).

Art Unit: 1625

Concerning the presence of the metal sponge supporting structure, the reference is silent. However, the supporting structure is directly related to the optimization of the catalyst activity. Similarly, Franczyk et al does indicate that the hydroxyl-resistant support in the catalyst by using the electroless metal coating on a suitable substrate is necessary because the reaction is carried out in the strong basic solution (see col. 4, lines 59-61); furthermore, the difference in the physical structure (metal sponge) does not have patentable weight over the prior art in the absence of an unexpected result. Therefore, it would have been obvious to the skilled artisan in the art to be motivated to change from the prior art's supporting structure to the claimed metal sponge as an alternative in order to have a better protection from the strong base in the process. This is because the skilled artisan in the art would expect such a modification to be successful as shown in the Franczyk et al.

Goto et al does teach the preparation of aminocarboxylic acid salts by oxidizing amine-group-containing primary alcohols with an alkaline medium in the presence of the modified Raney copper catalyst (14 weight % copper nitrate and 86 % zirconium oxychloride) (see col. 6, ex. 4 ,lines 44-45). Also, Franczyk et al does teach the process to prepare amino carboxylic acid salts by contacting the amino alcohols with the alkali metal hydroxide in the presence of the copper catalyst containing alkali-resistant carriers . Both have commonly shared the process of preparing aminocarboxylic acid salts with a similar condition. There is a teaching of equivalence

Art Unit: 1625

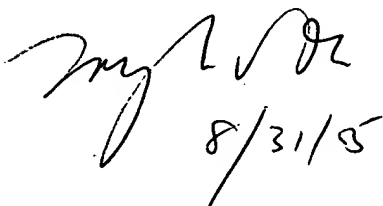
between the Goto et al and Franczyk et al with respect to using zirconium during the reaction process.

Therefore, it would have been obvious to the skilled artisan in the art to be motivated to incorporate the Franczyk's et al of non-copper metal into the the Goto et al catalyst composition in order to optimize the catalytic activity of the dehydrogenation catalyst. This is because the skilled artisan in the art would expect the catalytic activity in the process to increase by manipulating the amount of non-copper metal present in the catalyst composition as successfully shown in the Franczyk's et al reference.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Taylor Victor Oh whose telephone number is 571-272-0689. The examiner can normally be reached on 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cecilia Tsang can be reached on 571-272-0562. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


8/31/15